Installing and Commissioning the L1Cal Trigger

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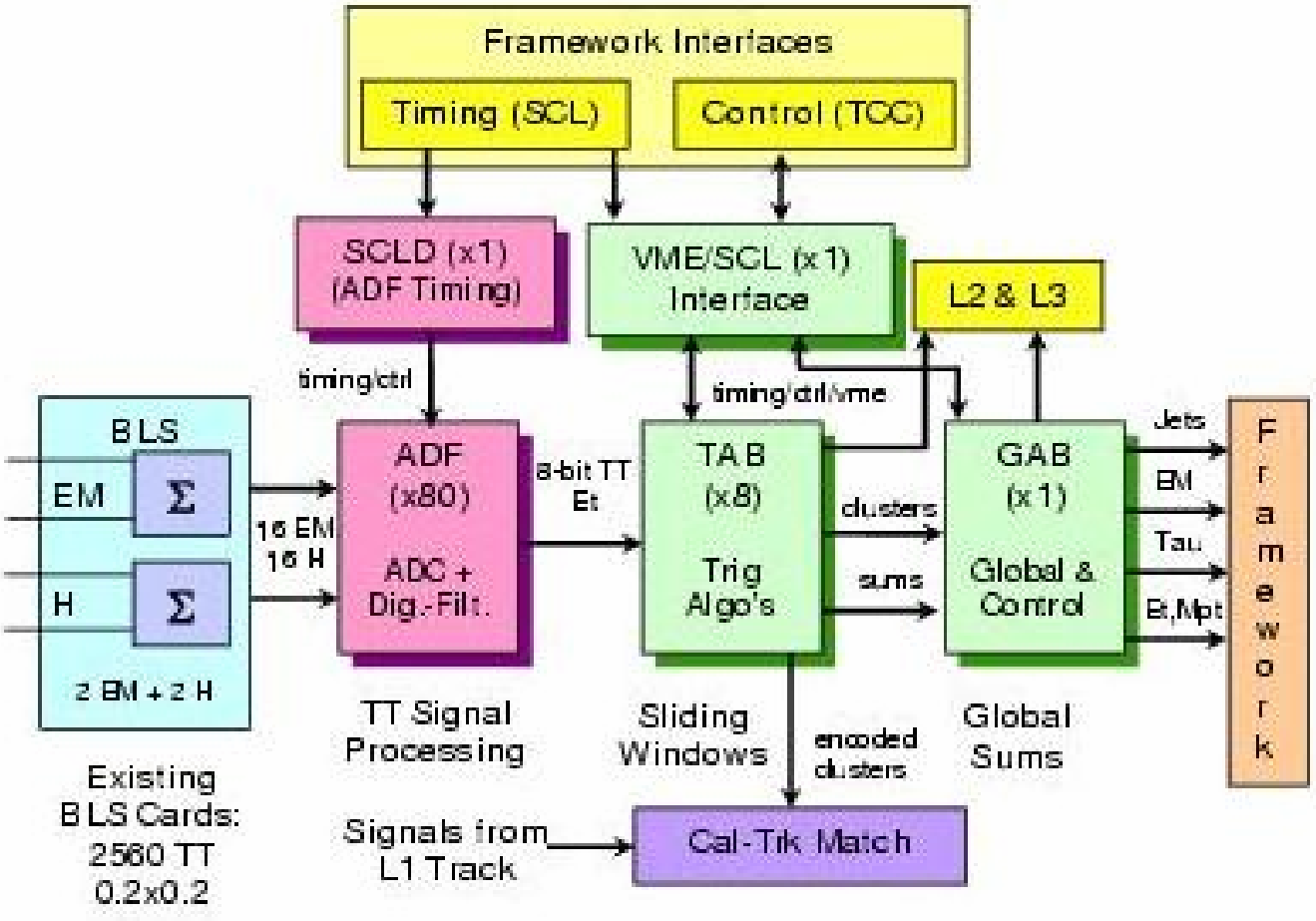
L1Cal Upgrade Overview



Opening Volley

- One can argue that the L1Cal trigger upgrade is the most critical upgrade to the experiment
  - It is completely new, technically complicated, and extensive
- Run "2a" experience
  - All trigger systems were fully commissioned late
  - Some trigger systems were very late
  - Some are still not yet commissioned
- How can the L1Cal trigger upgrade avoid a long commissioning time during running?
  - History says it can't

Installation and Commissioning Steps

- Step A – Bench testing
- Step B – Preproduction testing and integration in Test Area
- Step C – Production testing and integration in Test Area
- Step D – Installation in MCH1
- Step E – Final commissioning
  - If L1Cal is to be commissioned quickly after the 2005 shutdown (Step E), extensive hardware and software work must occur in Steps B and C

Installation and Commissioning Steps

- Step A (Bench testing)
  - Will assume hardware deliverables and bench testing follows the current schedule
  - However there are a few uncertainties here (eg SCLD, additional splitters)
  - An important milestone to watch is the start date of ADF production

Installation and Commissioning Steps

- Step B (Preproduction testing and integration in Test Area)
  - Use splitter signals (currently 4x2) from BLS sent to Test Area located outside MCH1
  - Can also eventually use TWG (Test Waveform Generator)
  - Goals
    - Verify operation of preproduction cards
    - Begin hardware and software integration into experiment
    - Begin digital filter, trigger, rate, noise studies
    - Begin building infrastructure (populated racks) that will eventually move into MCH1

Installation and Commissioning Steps

- Step B (Preproduction testing and integration in Test Area)
  - This step requires SCLD and v.2 ADF
  - This step requires additional manpower for integration (Integration into DAQ, data collection, data analysis, …)
  - This step requires additional manpower for building the infrastructure (lots of infrastructure details to plan and execute)
  - This step requires additional manpower for software (calibration, downloading, control, monitoring, alarms)

Installation and Commissioning Steps

- Step C (Production testing and integration in Test Area)
  - Use additional splitter signals (16x2) from BLS sent to Test Area located outside MCH1
  - Goals
    - Verify operation of production cards
    - Complete hardware and software integration into experiment
    - Complete infrastructure (populated racks) that will eventually move into MCH1
    - Complete digital filter, trigger, rate, noise studies

Installation and Commissioning Steps

- Step D (Installation in MCH1)
  - Remove racks/hardware in MCH1 and replace with racks/hardware in Test Area during 2005 shutdown
  - Big cabling job
  - Significant tech support required (double shifts)

Installation and Commissioning Steps

- Step E (Final commissioning)
  - Intensive period of understanding the new L1Cal trigger
    - Noise studies
    - Determination of digital filter coefficients
    - Determination of threshold reference sets
    - Understanding data collected with new L1Cal and L1CalTrack triggers
    - Understanding missing Et
    - Return to data-taking with high efficiency

Questions

- Can additional splitter signals be supplied to test sliding windows algorithms?

Two Cent Suggestions

- The present group, while excellent, is too small and needs to be enlarged by the start of the 2004 shutdown
- It is critical that the group find 2-3 postdocs/grad students who will become involved at the earliest commissioning stages and remain with the project until it is complete
  - Commissioning, not hardware, is their top responsibility
  - Short term rotations don't work
- 16 hour data-taking shifts should be started early on
  - Keeps pressure on to find/solve problems
  - Partially filled by the DØ shift pool?

Two Cent Suggestions

- Detailed lists for the different commissioning and installation steps should continue to be developed
  - Important to add real names and FTE, not just institutions
  - Important to bring new people in now, not a year from now
- Early milestones should be set with the penalty of direct intervention should they be missed

Conclusions

- The L1Cal trigger upgrade is the most critical upgrade to the experiment
- In trying to avoid a lengthy commissioning period
  - Integration must occur before 2005 shutdown
  - This is an enormous amount of work requiring additional, dedicated manpower